# Argumentation support

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# Argumentation Support: From Technologies to Tools

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## Abstract

Electronic argumentation support is increasingly important in today's networked society. Virtual research collaboration, e-business, and many other domains of professional life critically depend on adequate support of tools for productive argumentative interactions. However, a plethora of technologies exist that are not necessarily tools. A technology only is a tool if it serves the purposes of the community in which it is used. In this paper, we outline an approach to diagnose to what extent a particular argumentation technology is a tool. We do this by combining a socio-technical view on technologies with a pragma-dialectical approach to argumentation analysis. We argue that for technologies to become a tool, argumentation routines and design need to co-evolve. We illustrate our approach by applying it to a case on group report authoring.

## 1. Introduction

Argumentation is a crucial communicative activity in society. Many argumentation technologies exist, such as mailing lists, group decision support systems, co-authoring, and negotiation support systems. However, many of these technologies do not work very well in practice: they often support discussions that do not



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sufficiently contribute to the purposes of their users. An important question therefore is: how to select or design information technologies that better support the argumentative practices of their community of use? In other words, how do technologies become real tools?

Argumentation can be understood in two basic ways. There is having-arguments, which is the interactive pursuit of disagreement and controversy, and there is making-arguments, which is the interactive process of forming reasons and drawing conclusions to resolve some matter [O'Keefe, 1977]. Argumentation support is typically concerned with the latter but should not ignore the former. Support for argumentation should include the specific conversational moves, such as making a claim or responding to it. However, it should also enable the *design* of these interactions, in terms of augmenting, shaping, guiding, and facilitating argumentative interaction. Two research areas that have an interest in argumentation support are CSCW (Computer Supported Cooperative Work) and argumentation theory. CSCW has mainly focused on designing, building, and experimenting with ICT systems, such as group decision support systems or issue-based information systems (IBIS). Often, the underlying communicative interaction models are rather simple, however. Argumentation theory, on the other hand, has mostly concentrated on designing human procedures and methods. Although this field has developed subtle models for the design of argumentative interactions, the rigorous implementation and testing of these models in real systems is often lacking.

In this paper, we will not provide an extensive literature review on argumentation support theory, of which many volumes have been produced in the specialized domains of group decision and negotiation theory support, for instance. Instead, we aim to bridge the fields of CSCW and argumentation theory by outlining an approach for diagnosing the pragmatic role that an argumentation technology plays in a community of use as providing support for both argumentation moves and design. To this purpose, we combine a socio-technical view on argumentation support with a pragma-dialectical argumentation analysis approach.

## 2. Argumentation Technology in the Community: a Socio-Technical System

Each community has customary – often unarticulated – *argumentation routines*: the customary or expected argumentative practices that define who is allowed to speak, who may listen in, what types of arguments are admissible, how to resolve conflicts, and so on. On the other hand, a technology has a set of well-defined *functionalities* that enable its users to conduct some interactions, while constraining or preventing other behavior. A town hall meeting is a very good way

of assessing the emotions and sincerity of various stakeholders, but provides a poorly structured record of the precise arguments made. Decision exploration software is highly capable of recording, organizing, and providing access to the arguments advocating or refuting a particular issue, but makes it very hard for participants to evaluate the personal motivations of participants. So, selecting the right argumentation technology that through its functionalities maximizes its contributions to the argumentation goals, while minimizing the undesired limitations it puts on the argumentation process, is essential, but not trivial.

Each technology has a technical *functionality design*, which consists of all functions that operate on the information objects that the technology can process. The technical functionality design is made explicit in the manuals and tutorials associated with the technology. For instance, an IBIS allows its users to create issues, take positions on these issues, and make arguments pro and contra these. The QuestMap tool, grounded in this paradigm, translates these concepts (which it calls questions, ideas, and arguments, respectively) into such technical functions as 'creating root question', 'responding with idea to question', 'specializing idea', and 'add argument pro/con idea' [Conklin, 2003]. Such a functionality design theoretically supports a wide range of argumentation behaviors. However, the actual quality of the support a technology provides is determined by more than just the individual technical options of selecting a file, adding a comment, and asking or replying to a question. In argumentation terms, it is not sufficient to look at the technical functions that enable particular low-level argumentation moves. Implicit in the technology is also an *argumentation design*, which comprises the – often subtly - interrelated functionalities, procedures, checks and balances, and connotations that shape the practical range of argumentation behavior. The argumentation design often remains implicit. This can lead to breakdowns when the technology is applied in a real world situation, as unexpected behaviours emerge during use. For example, in the BCFOR case described in the next section, HyperNews, a web-based argumentation tool, was used instead of a mailing list to provide better access to the moves made in discussion arguments. In that it succeeded, but it unexpectedly failed, as the new functionality did not enable ad hoc discussion on the context of the discussion process. With the mailing list, ad hoc discussion support had been no problem. One solution to deal with the difference between the explicit functionality and implicit argumentation design of a technology is to stress the role of the human facilitator in designing the argument [Conklin et al., 2003]. Our approach, however, is to clearly diagnose the *socio-technical gap* between the argumentation routines prevailing in the community, and the argumentation design emerging from the functionality design of a specific argumentation technology. Examining and reducing this gap between what needs to be supported socially and what can be supported technically has become the central challenge in the field of CSCW [Ackerman, 2000]. This is not to say that human facilitation is not necessary. We do believe, however, that in better

matching preferred argumentation patterns with available technological designs, the need for human facilitation may be reduced and its effectiveness increased.

## 3. Technology Becoming a Tool: Co-Evolution of Argumentation Routines and Design

We have defined what it means that a technology *is* a tool for argumentation. Analyzing a case, we now shift our attention to the process in which a technology *becomes* such a tool. Understanding this process is important if proper support is to be provided for the continuous sensemaking process of both communal argumentation requirements and specifications of the supporting technological functionality.

### 3.1 The BCFOR Case

At the height of a conflict on a government decision to allow for clearcut logging in the Clayoquot Sound watershed, the British Columbia Forests and Forestry Group (BCFOR) was formed to discuss issues related to forests and forestry in the Canadian province of British Columbia. To dissolve the conflict, the government had appointed a Scientific Panel to write a series of reports defining new land-use policies. The group, however, was dissatisfied with the reports published, as they covered up important differences of opinion that might usefully contribute to further policy deliberation and decision-making about land-use policy. The group therefore decided to write its own *group reports* that would accurately identify the points where consensus existed and the points where differences prevailed. Their choice to create a different kind of policy report entailed foreseen and unforeseen choices about transforming their interaction with each other into an argumentation process that produced the desired report. There were many conflicting interests and points of view among the members of BFCOR. The group therefore required that the argumentation central to their collaborative report authoring be neutral and transparent [De Moor and Weigand, 1996]. Entailed in matters of developing effective and appropriate argumentation were issues about the technological support required to enable such argumentation among the participants. After experiments with the mailing list and HyperNews, the customized GRASS (Group Report Authoring Support System) tool was developed.

## 4. An Analysis of the Evolving Socio-Technical System

The challenge faced by both the Scientific Panel and the BCFOR group, like many groups, organizations, and communities, lies in creating an argumentation process

that produces a desired outcome. Increasingly, information and communication technologies are used to support these interactions. The mere presence of technology, however, does not mean that it will prove to be a viable tool for designing an argumentation process that produces desired outcomes. In BCFOR, the argumentation requirements of the group emerged as they made choices about how to interact and what technology to use in support of their argumentation. The incorporation and rejection of these technologies involved the group in recognizing aspects of argumentation they valued, such as maximum opportunities for the expression of disagreement, and incorporating means to articulate that aspect over other possible aspects of interaction among the participants.

| | *Intervention* | *Argumentation Routines* | *Argumentation Design* | *Socio-Technical Gap* |
|---|---|---|---|---|
| *Stage 1* | Mailing List set up by group members | Free discussion; informal sharing of opinions and information | Mailing List provides minimal structure and allows for ad hoc procedures | Small gap, mailing list works well for intended purpose |
| *Stage 2* | Members change purpose of interaction to authoring | Authoring: stating issues, taking positions, arguing claims, producing results | Mailing List same as in Stage 1 | Large gap, no functions to coordinate authoring argumentation |
| *Stage 3* | HyperNews implemented by group coordinators | Authoring: same as in Stage 2 | HyperNews gives better access to discussion threads | Reduces access gap; however, now lack of ad hoc functionality |
| *Stage 4* | Development of new routines, GRASS prototype | Authoring: synthesis and resolution, specialized editing roles, publication | GRASS gives full IBIS support, consensus assesment, resolution formulation | Gap narrows |

Table 1: Co-Evolution of Argumentation Routines and Designs in the BCFOR case

In making these choices, the group was not merely adopting or appropriating technology into preconceived ideas about argumentation but was also recreating and refining its capacity for argumentative communication and collaborative interaction. In other words, a clear *co-evolution* of argumentation routines and argumentation design took place. This evolutionary struggle is summarized in the 4 stages outlined in Table 1. Each stage was initiated by a particular intervention, such as a change in routine or design. It can be seen that, as a consequence, the socio-technical gap fluctuated considerably, but ultimately became smaller.

## 5. Towards a Diagnostic Method

In the previous sections, we showed that argumentation technologies have an explicit functional design, which results in an implicit argumentation design, in terms of support for both argumentation moves and the crafting of the process in which these moves are embedded. We also showed that there usually is a socio-technical gap between this argumentation design and the routines adopted by the community of use. The analysis of the co-evolution of argumentation routines and design in the BCFOR case was informal. We are working on a diagnostic method in order to more systematically perform such analyses in the future. Space does not permit us to outline this method in detail, we therefore only briefly sketch its main components here.

The diagnostic method consists of four main steps: (1) the implicit argumentation model (=argumentation routines) of the community of use is made explicit, (2) the implicit argumentation model (=argumentation design) of the technologies available to the community is made explicit, (3) both now explicit models are matched to identify the socio-technical gap, (4) recommendations are made to reduce the socio-technical gap, if necessary. Such recommendations may include changing the argumentation routines, the technologies used, or the roles these technologies play in the community. Pragma-dialectics provides the advanced theoretical models required to reconstruct the discourse by capturing the subtleties of the pragmatics of argumentative interaction. The basic elements of these models consist of the purpose, means of orchestration, and the systemic rationality designed into the technology [Aakhus, 2002]. The *purpose* refers to the aim of reconstructing an argument, the *orchestration* to how the relevant argumentative activity is structured, and the *systemic rationality* to how argumentative activity warrants the outcome of the argumentation. Many normative insights on successful argumentation models framed in these terms have been made in this field, which can therefore serve as an important theoretical input in our diagnostic method.

## 6. Conclusion

This diagnostic approach, once fully developed, may contribute to more successful collaboration by better tailoring technological argumentation designs to communal argumentation routines. The proposed approach gives a fuller account of argumentation support than provided by standard CSCW perspectives that only look at the direct support of conversational moves. By including a pragma-dialectical lens on argumentation routines, also the subtle crafting of argumentation is given proper attention. On the other hand, the potential gap with

available technology is clarified by making explicit the implicit argumentation design embedded in the technology. This may contribute to the evolution of argumentation theory, as it allows for sophisticated argumentation models to be better tested in actual technologies, thus closing the theoretical-empirical cycle.

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